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Numerical simulation of a two-component mixture (fluid-particles) between two plates

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ABSTRACT

In this study, we study a two-component mixture, composed of rigid solid particles and a fluid. Mixture theory is used to model the interaction between the two different components. For the granular materials, we assume the Cauchy stress tensor depends on the shear rate and the density gradient of the granular materials, and the fluid is assumed to behave as a Newtonian fluid. We study the fully developed flow of this mixture between two flat plates. A parametric study is performed to study the effects of the material parameters, especially those related to the normal stress differences. We then consider the effects the slip boundary condition.